

Diesel Retrofit Programs for Construction Equipment

The Central Artery/Tunnel Project Boston, Massachusetts

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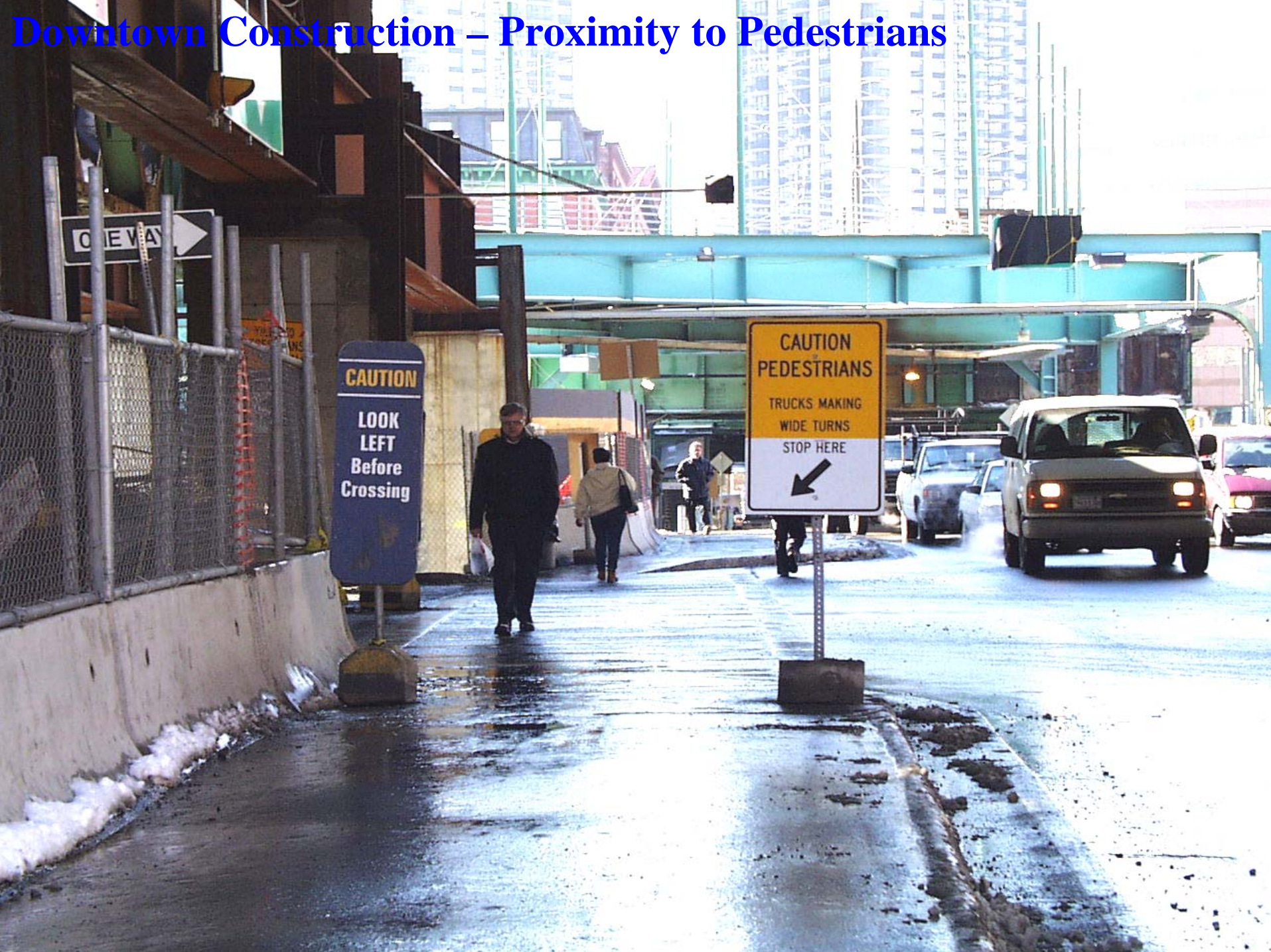
CA/T Program Purpose/Goals

- Reduce diesel impacts on abutters and construction workers.
- Help CA/T Project meet its environmental commitments.
- Reduce regional emissions.
- Good public relations.

Downtown Construction – Proximity to Abutters



Downtown Construction – Proximity to Pedestrians



CA/T Diesel Retrofit Program

- Originated in fall 1998 in collaboration with the Massachusetts DEP and NESCAUM.
- Only off-road equipment retrofitted.
- Focus on equipment near:
 - Residential communities.
 - Hospitals.
 - Building fresh air intakes.
 - Underground areas (worker health & safety).

Oxidation Catalysts Instead of Diesel Particulate Filters

- Reduce CO, HC, Odors.
- Ease of installation and maintenance.
- Lower unit cost (\$ 2,000 versus \$ 13,000).
- Proven technology (over 1 million in use).

Retrofit Program Phase 1

- 8 pieces of equipment retrofitted.
- 3 contractors participated.
- Oxidation catalysts provided by MECA.
- Contractors contributed installation costs.
- Equipment manufacturers provided written assurance on engine warranty.

Retrofit Program Phase 2

- Retrofitted 60 additional pieces of equipment.
- CA/T provided oxidation catalysts.
- Contractors contributed installation costs.

Equipment Retrofitted

50 – 300 HP range engines, including

- Cranes.
- Lifts.
- Excavators.
- Bulldozers.
- Generators.
- Compressors.

Retrofit Program Costs & Operational Issues

- Oxidation Catalysts cost \$1,000 to \$3,000 per unit (\$2,500 average).
- Installation time < 2 hours.
- No adverse effects on equipment performance.
- Warranty concerns (resolved in Phase 1).

Downtown Tunnel Construction





MANTIS

97.240

SpanDeck

13212

MANTIS

S 14010

4.2.0







340
Caterpillar Inc.

D6R LGP

MODERN



The Cigar Lady
SUGARS

Wayside
rentals & leasing
OFFICE &
STORAGE TRAILERS
STORAGE CONTAINERS
• Hauling • Leasing • Renting • Sales

Wayside
rentals & leasing
OFFICE &
STORAGE TRAILERS
STORAGE CONTAINERS
• Hauling • Leasing • Renting • Sales



THIS MACHINE
IS EQUIPPED WITH
AN AIR POLLUTION
CONTROL DEVICE

TH83

97 273

CAT

CAT REGD

TH83

**THIS MACHINE
IS EQUIPPED WITH
AN AIR POLLUTION
CONTROL DEVICE**

NOTICE

IMPROPER LIFTING OR
CAN ALL THE LOAD TO
CAUSE INJURY AND DEATH.
1. BEFORE THE LIFTING, THE
OPERATOR MUST BE SURE
THAT THE LOAD IS
DISTRIBUTED
2. THE PROPER LIFTING
TECHNIQUE MUST BE
USED
3. THE LIFTING MUST BE
DONE IN A SMOOTH
MANNER
4. THE LIFTING MUST BE
DONE IN A SMOOTH
MANNER
5. THE LIFTING MUST BE
DONE IN A SMOOTH
MANNER

Emission Reduction Potential

Estimated % reduction according to EPA certification list:

- CO = 40%.
- HC = 50%.
- PM = 20%.

Emission Reductions of Retrofit Program

- For the year 2000:
 - 90 Kg/day (36 tons/yr) of CO.
 - 30 Kg/day (12 tons/yr) of HC.
 - 8 Kg/day (3 tons/yr) of PM10.
- Based on 88 pieces of equipment retrofitted.
- Reductions double between 2001 –2004.
- Slowly decrease to 2000 levels after 2004.

Benefits of Retrofit Program

- Very cost effective way to reduce construction equipment emissions.
- Low cost (\approx 1-2 % of equipment cost).
- Can achieve 20-50 % emission reduction.
- Can eliminate diesel odor problem.

